

CLAIMS

We claim:

1. A method for identifying a compound which modulates biofilm formation, comprising identifying a compound which modulates the activity of a polynucleotide, or a polypeptide encoded by said polynucleotide or a control region of said polynucleotide, wherein the polynucleotide is a coding sequence selected from the group consisting of *flgB*, *flgE*, *flgH*, *flgI*, *flgK*, *flhA*, *flhB*, *flhD*, *fliA*, *fliD*, *fliF*, *fliG*, *fliI*, *fliL*, *fliM*, *flip*, *fliR*, *dnaK*, *mdoG*, *rfaQ*, *rfaG*, *rfaP*, *wecB*, *yojN*, *arcB* and *frdA*, *b1936*, *yhjH*, *tolA*, *rnhB*, *rep*, *mreB*, *aroD*, *clpX*, *leuO*, *leuL*, *miaA*, *prfC*, *ptrB*, *rnpB*, *b2531*, *yedK*, *yjcC*, *yjjQ*, *ykgK*, *hscA* and *trs5_7*, *fucA*, *rbsK*, *glnE*, *wcaI*, *modA*, *modC*, *moa*, *nhaA*, *yecK*, *ycdS*, *ycdR*, *ycdQ* *ycdP*, and *b1904*, comprising the steps of:

- (a) selecting a host cell having said polynucleotide;
- (b) cloning said host cell and separating said clones into a test group and a control group;
- (c) treating said test group using a compound; and
- (d) determining the relative quantity of an expression product of said polynucleotide, as between said test group and said control group.

2. The method of claim 1, wherein said host cell is heterologous to said polynucleotide.

3. The method of claim 1, wherein said coding sequence is selected from the group consisting of *nhaR*, *ptrB*, *yjjQ*, *wcaI*, *yecK*, and *b1904*.

4. The method of claim 3, wherein said coding sequence is *nhaR*.

5. A method for screening a medium for a biofilm polypeptide encoded by a polynucleotide selected from the group consisting of *flgB*, *flgE*, *flgH*, *flgI*, *flgK*, *flhA*, *flhB*, *flhD*, *fliA*, *fliD*, *fliF*, *fliG*, *fliI*, *fliL*, *fliM*, *flip*, *fliR*, *dnaK*, *mdoG*, *rfaQ*, *rfaG*, *rfaP*, *wecB*, *yojN*, *arcB* and *frdA*, *b1936*, *yhjH*, *tolA*, *rnhB*, *rep*, *mreB*, *aroD*, *clpX*, *leuO*, *leuL*, *miaA*, *prfC*, *ptrB*, *rnpB*, *b2531*, *yedK*, *yjcC*, *yjjQ*, *ykgK*, *hscA* and *trs5_7*, *fucA*, *rbsK*, *glnE*, *wcaI*, *modA*, *modC*, *moa*, *nhaA*, *yecK*, *ycdS*, *ycdR*, *ycdQ* *ycdP*, and *b1904*, comprising;

- (a) labelling an antibody immunoreactive with said polypeptide with a marker molecule to form a conjugate;

- (b) exposing said conjugate to said medium; and
- (c) determining whether there is binding between said conjugate and a biomolecule in said medium, wherein said binding indicates the presence of said polypeptide.

6. The method of claim 5, wherein said polynucleotide is selected from the group consisting of *nhaR*, *ptrB*, *yjjQ*, *wcaI*, *yecK*, and *b1904*.

7. The method of claim 6, wherein said polynucleotide is *nhaR*.

8. A method for identifying a compound which modulates biofilm formation, comprising identifying a compound which modulates the activity of a polynucleotide, wherein the polynucleotide is a coding sequence selected from the group consisting of *flgB*, *flgE*, *flgH*, *flgI*, *flgK*, *flhA*, *flhB*, *flhD*, *fliA*, *fliD*, *fliF*, *fliG*, *fliI*, *fliL*, *fliM*, *flip*, *fliR*, *dnaK*, *mdoG*, *rfaQ*, *rfaG*, *rfaP*, *wecB*, *yojN*, *arcB* and *frdA*, *b1936*, *yhjH*, *tolA*, *rnhB*, *rep*, *mreB*, *aroD*, *clpX*, *leuO*, *leuL*, *miaA*, *prfC*, *ptrB*, *rnpB*, *b2531*, *yedK*, *yjcC*, *yjjQ*, *ykgK*, *hscA* and *trs5_7*, *fucA*, *rbsK*, *glnE*, *wcaI*, *modA*, *modC*, *moa*, *nhaA*, *yecK*, *ycdS*, *ycdR*, *ycdQ* *ycdP*, and *b1904*, comprising the steps of:

- (a) selecting a regulatory element from the 5' region of said polynucleotide;
- (b) fusing said regulatory element to a reporter gene to create a fusion gene;
- (c) selecting a host cell comprising said fusion gene;
- (d) cloning said host cell and separating said clones into a test group and a control group;
- (e) treating said test group using a compound; and
- (f) determining the relative quantity of an expression product of said reporter gene, as between said test group and said control group.

9. The method of claim 8, wherein said polynucleotide is selected from the group consisting of *nhaR*, *ptrB*, *yjjQ*, *wcaI*, *yecK*, and *b1904*.

10. The method of claim 9, wherein said polynucleotide is *nhaR*.

11. A method for identifying an environmental factor which modulates biofilm formation, comprising identifying an environmental factor which modulates the activity of a polynucleotide, wherein the polynucleotide is a coding sequence selected from the group consisting of *flgB*, *flgE*, *flgH*, *flgI*, *flgK*, *flhA*, *flhB*, *flhD*, *fliA*, *fliD*, *fliF*, *fliG*, *fliI*, *fliL*, *fliM*, *flip*, *fliR*, *dnaK*, *mdoG*, *rfaQ*, *rfaG*, *rfaP*, *wecB*, *yojN*, *arcB* and *frdA*, *b1936*, *yhjH*, *tolA*, *rnhB*, *rep*, *mreB*, *aroD*, *clpX*, *leuO*,

leuL, *miaA*, *prfC*, *ptrB*, *rnpB*, *b2531*, *yedK*, *yjcC*, *yjjQ*, *ykgK*, *hscA* and *trs5_7*, *fucA*, *rbsK*, *glnE*, *wcaI*, *modA*, *modC*, *moa*, *nhaA*, *yecK*, *ycdS*, *ycdR*, *ycdQ* *ycdP*, and *b1904*, comprising the steps of:

- (a) selecting a regulatory element from the 5' region of said polynucleotide;
- (b) fusing said regulatory element to a reporter gene to create a fusion gene;
- (c) selecting a host cell comprising said fusion gene;
- (d) cloning said host cell and separating said clones into a test group and a control group;
- (e) subjecting said test group with a different environmental condition as compared to said control group; and
- (f) determining the relative quantity of an expression product of said reporter gene, as between said test group and said control group.

12. The method of claim 11, wherein said polynucleotide is selected from the group consisting of *nhaR*, *ptrB*, *yjjQ*, *wcaI*, *yecK*, and *b1904*.

13. The method of claim 12, wherein said polynucleotide is *nhaR*.

14. An isolated polynucleotide sequence, comprising a polynucleotide sequence which is selected from the group consisting of:

- (a) a sequence selected from the sequences listed in Figure 5;
 - (b) a sequence which is at least 90% homologous with a sequence of (a);
 - (d) a sequence which is at least 95% homologous with a sequence of (a);
 - (e) a sequence which is at least 98% homologous with a sequence of (a);
 - (f) a sequence which is at least 99% homologous with a sequence of (a);
- and;
- (g) a sequence which hybridizes to any of (a) to (f) under stringent conditions.

15. A vector comprising a polynucleotide sequence of claim 14 in a suitable vector.

16. A host cell comprising a polynucleotide sequence of claim 14 in a host cell which is heterologous to said sequence.

17. A vector of claim 15, wherein said vector contains or encodes a tag.

18. A method for identifying a compound which inhibits or promotes biofilm formation, comprising the steps of:

- (a) selecting a host cell of claim 3;
- (b) cloning said host cell and separating said clones into a test group and a control group;
- (c) treating said test group using a compound; and
- (d) determining the relative quantity of an expression product of said sequence, as between said test group and said control group.

19. The method of claim 18, wherein said sequence is selected from the group consisting of strains 9B10-1, 32A4-2, 141G2-2, 68A3-1 and 141G2-2.

20. The method of claim 19, wherein said strain is 9B10-1.